

SITE ASSESSMENT DECISION - EPA FORM 1

Site Name: Hubbard Hall Chemical Inc. EPA ID#: CTD981898422
 Alias Site Names: _____
 City: Waterbury County or Parish: _____ State: CT
 Refer to Report Dated: PA: _____ SI: Aug. 6, 1993 Other (report type & date): _____
 Report developed by: Wesley ARCS

DECISION:

1. Further Action under Superfund (CERCLA) is not appropriate or required because:
- 1a. Site Evaluation Accomplished (SEA). 1b. Action Deferred to: ☐ RCRA
☐ NRC
2. Further Investigation Needed Under Superfund: 2a. Priority: ☐ Higher ☒ Lower
- 2b. Activity Type: ☐ PA ☒ ESI
☐ SI ☐ evaluate HRS score
- ☐ Other: _____

DISCUSSION/RATIONALE:

No nearby drinking water well. Runoff may carry contaminants to Naugatuck River.

Report Reviewed and Approved by: _____ Signature: J. Anderson Date: 8/9/93
 Site Decision Made by: _____ Signature: _____ Date: _____

**FINAL SITE INSPECTION REPORT
FOR**

**HUBBARD HALL CHEMICAL INC.
WATERBURY, CONNECTICUT**

**CERCLIS No. CTD981898422
TDD No. 9105-80-AWS
Work Assignment No. 09-1JZZ**

Prepared by:

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August 6, 1993

WESTON/ARCS

Reviewed and Approved:

Martha J. Jernan 6 August 1993
Task Manager Date

George G. Gurney for Carolyn Boesch 8/6/93
Site Manager Date

George G. Gurney 8/6/93
QA Review Date

Work Order No. 4100-09-57-0007

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**Final Site Inspection Report
Hubbard Hall Chemical Inc.
Waterbury, Connecticut**

**CERCLIS No. CTD981898422
TDD No. 9105-80-AWS
Work Assignment No. 09-1JZZ
Work Order No. 4100-09-57-0007**

INTRODUCTION

The Roy F. Weston, Inc. Alternative Remedial Contract Strategy (WESTON/ARCS) team was requested by the Region I U.S. Environmental Protection Agency (EPA) Waste Management Division to perform a Site Inspection of the Hubbard Hall Chemical Inc. Inc. property in Waterbury, Connecticut. All tasks were conducted in accordance with the ARCS contract, and the Site Inspection scope of work and technical specifications provided by the EPA under Work Assignment No. 09-1JZZ which was issued to WESTON/ARCS on March 26, 1991. NUS Corporation prepared a Preliminary Assessment of Hubbard Hall Chemical Inc. on July 27, 1987. The Hubbard Hall Chemical Inc. Site Inspection was initiated based on the information provided in the Preliminary Assessment.

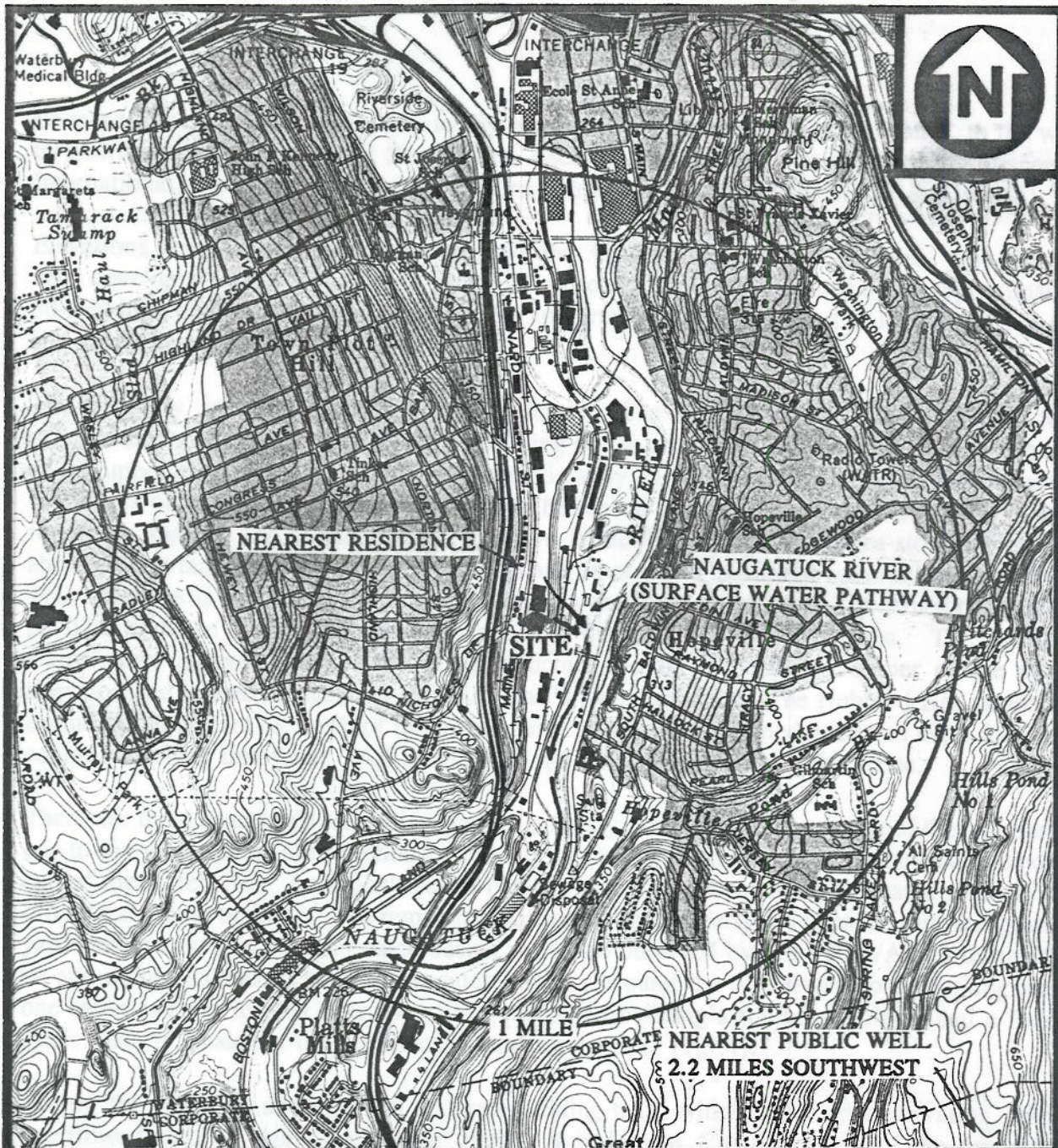
Background information used in the generation of this report was obtained through file searches conducted at the Connecticut Department of Environmental Protection (CT DEP) and the Region I EPA, interviews with town officials and individuals knowledgeable of the site history and characteristics, and conversations with other Federal, State and local agencies. Information was also collected during the WESTON/ARCS on-site reconnaissance conducted on September 24, 1992, and the WESTON/ARCS sampling event conducted on October 6, 1992.

This package follows guidelines developed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State or local regulations. Site Inspections are intended to provide a preliminary screening of sites to facilitate EPA's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

SITE DESCRIPTION

Hubbard Hall Chemical Inc. Inc. (Hubbard Hall) is located on a 15 acre parcel at 563 South Leonard Street in Waterbury, New Haven County, Connecticut (latitude 41° 31' 48" N, longitude 73° 02' 24" W) (Figure 1) [3]. Hubbard Hall blends cleaning chemicals for specialty metal finishing and printed circuit boards and distributes commodity chemicals (i.e. bulk virgin chemicals), which are sold for industrial and municipal use. Cleaning and finishing chemicals manufactured and stored at the facility include soaps, detergents, acid salts, chlorinated solvents, flammable solvents, acids, burnishing compounds and other miscellaneous compounds [2]. The operation is currently active and has 87 employees [1].

Hubbard Hall is located within an area zoned for commercial and industrial use. Residential areas are located one-quarter mile east and west of the site. The Naugatuck River is located 500 feet east of the Hubbard Hall property [4]. The property is bordered to the south by South



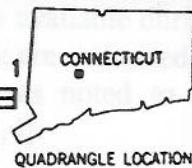
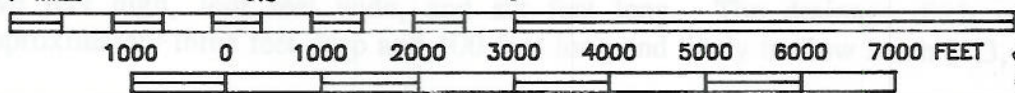
BASE MAP IS A PORTION OF THE FOLLOWING U.S.G.S. QUADRANGLE(S):

WATERBURY, CONNECTICUT 1984 1:24,000

1 MILE

0.5

0



LOCATION MAP
HUBBARD HALL CHEMICAL, INC.
WATERBURY, CONNECTICUT

WESTON
MANAGERS DESIGNERS/CONSULTANTS

FIGURE 1

trichloroethane (54,000 gallons), MEK (4,000 gallons), acetone (8,000 gallons), perchloroethylene (10,000 gallons), freon (5,500 gallons), and various acids [1].

Six underground storage tanks (USTs) were known to be located on the property [1,4,6]; one is currently located on the property. An 8,000 gallon UST was replaced with a 10,000 gallon UST in 1989. Two 4,000 gallon USTs were removed from the site in 1989. Two 1,000 gallon USTs were removed at unknown dates. Table 1 presents the reported locations, contents and installation/removal dates of the current and former USTs known to be on-site.

Table 1
Underground Storage Tanks at
Hubbard Hall Chemical Inc.

Tank Size and Contents	Location	Installation Date	Removal Date
8,000 gallon oil/petro.	South of main building	May 1966	April 1989
4,000 gallon oil/petro.	North side of main building.	April 1969	April 1989
4,000 gallon oil/petro.	North side of main building.	April 1969	April 1989
1,000 gallon fuel oil.	Located beneath two ASTs at the tank farm.	April 1969	Unknown
10,000 gallon fuel oil.	South of main building. This UST replaced the 8,000 gallon UST removed in April 1989.	April 1989	April 2019
1,000 gallon fuel oil.	North of maintenance garage in vacant lot.	Unknown	Unknown

[6,7].

OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

Hubbard Hall was founded in 1849 in Waterbury, Connecticut by Apothecaries Hall who purchased the South Leonard Street property in 1952 and later constructed a chlorine plant near the existing tank farm in 1955. The warehouse was constructed later that decade [1]. In 1964, Kerr McGee purchased Hubbard Hall and later sold it to Rex Forge (a.k.a. Conrex) in 1966. Hubbard Hall's current owner, Charles T. Kellogg, purchased the property from Conrex in 1974 [1,8]. Hubbard Hall's chlorine packaging operations were later sold to Jones Chemical in 1985. According to the Hubbard Hall site contact, the property was a railroad house prior to 1955 [1].

Hubbard Hall specializes in manufacturing and commodity distribution of cleaning and finishing chemicals used in the metal finishing and printed circuit board industries [1]. Chemicals currently manufactured and stored at the facility include soaps, detergents, acid salts, chlorinated solvents, flammable solvents, acids, burnishing compounds and other miscellaneous compounds [1]. Facility operations include the mixing of dry cleaning compounds; dry and wet blending of cleaning compounds; mixing and packaging of chlorine; repackaging of chlorinated and flammable solvents, and acids; laboratory bench-scale testing; refurbishing ASTs for resale to clients; and maintaining the truck fleet. The facility's bench-scale testing laboratory simulates

plating operations to ensure their cleaning compounds meet customer performance standards [1].

Wastes generated at Hubbard Hall include plating wastes (acids/alkalines, and cyanide); organic strippers with chlorinated solvents and cresylic acid; chlorinated solvents; mineral spirits (alcohols); rinses from mixing and blending operations; scrubber sludge; burnishing compounds; and waste oils [1,30,31,32,33,34,35]. These wastes are generated from blending and mixing errors, dead stock and bench-scale plating studies [1]. All wastes have reportedly been collected and transported off site since September 1985. Prior to September 1985, documented waste disposal history is limited. According to a 1962 State inspection, industrial wastes were discharged to a railroad drainage ditch located 576 feet north of the subject property's southeast boundary. A 1979 State inspection report, noted that all industrial wastes were discharged to the municipal sewer system and that storm drainage and floor drains discharged to a system of cisterns located near the facility's tank farm. Hubbard Hall began collecting all wastes and transporting them off-site in June 1985. [1]. According to the Hubbard Hall contact, wastes are stored on-site for a maximum of 72 hours prior to transportation off-site for processing/disposal. Reports detailing chemical wastes transported off-site are provided in Attachment A.

Documented waste disposal history dates back to April 1962. Table 2 provides documented regulatory information from 1962 to the present.

Table 2

**Documented Regulatory Activities at
Hubbard Hall Chemical, Inc.**

Date	Regulatory Activities at Hubbard Hall Chemical, Inc.
April 16, 1962	CT DEP inspection report noted Hubbard Hall was discharging concentrated industrial waste into a railroad drainage ditch located at the property's east boundary.
February 27, 1979	CT DEP reported all industrial waste was currently discharged to the municipal sewer system. The report also mentioned storm drainage and floor drains from the chlorine packaging plant (AST tank farm) discharge to a system of cisterns located on the lower elevation near the chlorine packaging plant. Floor drains in the warehouse discharge to the municipal sewer. This observation was again noted in the September 21, 1983 Hazardous Waste Inspection Checklist.
July 28, 1981	RCRA Inspection Checklist completed by the EPA and CT DEP, reported Hubbard Hall was currently collecting their customer's spent detergents and transporting the waste to a State approved recycling center for re-processing.
September 3, 1982	CT DEP received an anonymous complaint that Hubbard Hall allegedly dumped approximately 8,000 gallons of chlorinated and non-chlorinated solvents in a pit reportedly located on the lower elevation of the Hubbard Hall property in mid-July 1982. The pit was estimated to be 30 feet in diameter and 20 feet deep. The complainant's description of the pit location was unclear. However, the CT DEP investigated the complaint on October 14, 1982 and presumed the alleged dumping site to be in the general vicinity of an access road currently under construction. Although the CT DEP could not substantiate the complainant's allegations, laboratory results (received on November 9, 1982) indicated trace amounts of chlorinated solvents. Analytical results could not be located during the background investigation.

Table 2

**Documented Regulatory Activities at
Hubbard Hall Chemical, Inc.
(Continued)**

Date	Regulatory Activities at Hubbard Hall Chemical, Inc.
September 21, 1983	A Hazardous Waste Inspection Checklist completed by the CT DEP reported all floor drains inside the warehouse discharged to the municipal sewer while storm drainage and floor drains inside the chlorine packaging plant discharged to a system of cisterns located near the tank farm. The cisterns exact location could not be determined during the background investigation.
May 17, 1984	A CT DEP Hazardous Waste Inspection Checklist noted no waste water treatment was currently performed on site; according to the site contact, many rinses were reported to have been recycled or renewed. The CT DEP requested a waste determination of sludge generated from the warehouse ventilation system's wet scrubber located inside the building. The request was made again in the July 25, 1985 and August 1, 1986 Hazardous Waste Inspection Checklists. On October 6, 1986, HRP Associates, Inc. (HRP) sampled the sludge for Hubbard Hall and reported the sludge to be non-hazardous.
October 15, 1984	An Emergency Incident Report was filed by Hubbard Hall with the CT DEP concerning a 2,800 gallon methylene chloride spill to the ground. The spill reportedly occurred near the transfer pumping station, during a transfer operation. HRP performed an emergency investigation of the spill on same day. HRP excavated approximately 204 cubic yards of soil over a five day period. Post-excavation soil samples were collected to confirm that all contaminated soils had been removed prior to backfilling with clean material. All excavated soils were disposed at a landfill approved by the CT DEP. A report detailing the cleanup activities of this spill is provided as Attachment D-1.
October 18, 1984	A second Emergency Incident Report was filed by Hubbard Hall with the CT DEP concerning a 25 to 30 gallon spill of 1,1,1-trichloroethane released to the ground which reportedly occurred near the transfer pumping station. HRP again performed an emergency investigation of the spill on same day and removed approximately seven cubic yards of contaminated soil over a five day period. Post-excavation soils were collected to confirm the absence of residual contamination prior to backfilling with clean material. Analytical results of soil samples collected from the walls and floor of excavated pits indicated methylene chloride concentrations between 3.0 and 1,304.6 mg/L. Further excavation reduced these concentrations to levels of non-detect to 1.55 mg/L. Analytical results from soil samples collected at the base and wall of excavated pits indicated concentrations of 1,1,1-trichloroethane ranging between non-detect and 0.11 mg/L. All excavated soils were disposed at a landfill approved by the CT DEP. A report detailing the cleanup activities of both spills is provided as Attachment D-1.
December 19, 1984	The CT DEP contacted the Connecticut State Attorney General's Office regarding a violation which sited Hubbard Hall for transporting hazardous waste in a vehicle not authorized for such use by their transporter permit. Details regarding the transporter permit and permit violation were not available during the background review.
mid-June, 1985	Hubbard Hall reportedly installed a holding tank system to store rinse water (i.e. waste water) considered hazardous. Prior to this date, rinse water was neutralized prior to discharging to the sanitary sewer.

Table 2

**Documented Regulatory Activities at
Hubbard Hall Chemical, Inc.
(Concluded)**

Date	Regulatory Activities at Hubbard Hall Chemical, Inc.
July 25, 1985	The CT DEP Hazardous Waste Inspection Checklist cited five compliance issues. They included the lack of information as it relates to scrubber sludge waste determination; the absence of an inspection schedule & log; the lack of personnel training (i.e. RCRA training, Right to Know, Personal Protective Equipment); the lack of adequate aisle space between drums of waste in the warehouse; and the lack of labeling of tanks and drums known to contain hazardous wastes.
September 5, 1985	Notice of Violation from the CT DEP was sent to Hubbard Hall outlining the compliance issues addressed in the July 25, 1985 Hazardous Waste Site Inspection Debriefing Memo.
September 17, 1985	As a follow-up to the July 25, 1985 Hazardous Waste Inspection Checklist, the CT DEP Water Compliance/Hazardous Waste Management Unit conducted an Industrial Survey of Hubbard Hall's water usage and waste disposal practices. The survey recommended all sinks and floor drains in the plating area and upper level of the mixing area, which discharged to the sanitary sewer or cisterns, be tied into Hubbard Hall's new waste collection system.
August 1, 1986	A CT DEP Hazardous Waste Inspection Checklist again cited compliance issues addressed during the July 25, 1985 Hazardous Waste Inspection Checklist. Hubbard Hall provided the CT DEP with the required information on August 19, 1986, September 9, 1986 and January 5, 1987. The August 19, 1986 and September 9, 1986 documents could not be located during the background investigation.
October 6, 1986	While sampling the scrubber sludge requested during the May 17, 1984 CT DEP Hazardous Waste Inspection, Hubbard Hall also requested HRP to sample the facility's waste water. Laboratory data reported hazardous concentrations of chromium (0.7 mg/L) and a high pH (14.22).
January 23, 1987	Hubbard Hall informed the CT DEP Water Compliance Unit that floor drains discharging to the municipal sewer and cisterns had been tied into the facility's waste water collection system. A CT DEP follow-up visit on February 19, 1987 confirmed the recommended changes had been made.
March 27, 1987	Draft Preliminary Assessment of the Hubbard Hall property is submitted to the EPA by NUS Corporation.
July 27, 1987	Final Preliminary Assessment of the Hubbard Hall property is submitted to the EPA by NUS Corporation. The report recommended a low priority Site Inspection be performed of the facility.
September 24, 1992	WESTON/ARCS performed On-site Reconnaissance of facility.
October 6, 1992	WESTON/ARCS performed sampling event and collected nine soil samples and two sediment samples.

[1,4,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,33]

Potential source areas were chosen based on the September 24, 1992 WESTON/ARCS OSR observations and a review of information gathered during the background investigation.

sites are potential RCRA sites; four sites are potential CERCLIS sites; and six sites are both potential RCRA and CERCLIS sites. A list of these facilities is provided in Attachment B.

WASTE/SOURCE SAMPLING

On October 6, 1992, WESTON/ARCS collected three potential source soil samples and one potential source sediment sample from areas identified during the September 24, 1992 OSR. Soil and sediment samples were submitted for full organic, total metals, and cyanide analyses through the EPA Contract Laboratory Program (CLP). Table 4 presents the summary information for each source area sampled.

Table 4

**Sample Summary: Hubbard Hall Chemical Inc.
Source Samples Collected by WESTON/ARCS on October 6, 1992**

Sample Location No.	Traffic Report No.	Time	Remarks	Sample Source	Sample Description
MATRIX: SOIL					
SS-01	ADD41 MAAZ60	0805	Grab for VOCs. All others were Composites, depth = 18 inches	Collected beside four 12 ft by 12 ft concrete pads located at former transfer pumping station.	Soil comprised of damp brown silt with some coarse sand.
SS-02	ADD42 MAAZ61	0805	Grab for VOCs. All others were a Composite, depth = 18 inches	Duplicate of SS-01 for quality control.	Soil comprised of damp brown silt with some coarse sand.
SS-03	ADD43 MAAZ62	0830	Grab for VOCs. All others were a Composite, depth = 18 inches	Collected around single 12 ft by 12 ft concrete pads (MS/MSD for quality control).	Soil comprised of damp brown silt with some coarse sand.
SS-04	ADD44 MAAZ63	0910	Grab for VOCs. All others were a Composite, depth = 18 inches	QA/QC reference sample collected in vacant lot 64 feet north of maintenance garage.	Soil comprised of dry brown silt with some coarse sand.
MATRIX: SEDIMENT					
SD-10	ADD50 MAAZ69	1330	Grab, depth = 3 inches	Collected from concrete holding tank located at east property line 576 feet north of South Leonard Street.	Soil comprised of dry brown silt with some fine sand.

MS/MSD = Matrix Spike/Matrix Spike Duplicate
[4]

Table 5 is a summary of compounds and elements detected through CLP analyses of WESTON/ARCS source area soil and sediment samples. For each sample location, a compound or element is listed if it is detected at three times or greater than the reference sample concentration (SS-04). Compounds or elements which occur at a concentration three times or greater than the reference concentration are designated by their approximate relative concentration above the reference sample concentration. However, if the element or compound is not detected in the reference sample, the reference sample's SQL (for organic analyses) or SDL (for inorganic analyses) is used as the reference value. Accordingly, these compounds or elements are listed by their approximate relative concentration only if they occur at a value equal to or greater than the reference sample's SQL or SDL.

The complete analytical results of the WESTON/ARCS sampling activities, including quantitation and detection limits, are presented in Attachment C. Sample results qualified with a "J" on the analytical tables are considered approximate because of limitations identified during the CLP data validation. In addition, organic sample results reported at concentrations below quantitation limits and confirmed by mass spectrometry are also qualified by a "J" and considered approximate.

Table 5

**Summary of Analytical Results:
Source Sample Analysis for Hubbard Hall Chemical Inc.**

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SS-01 ADD41 MAAZ60	Acetone	130 ug/kg J	10 ug/kg	13 x SQL
	Trichloroethene	46 ug/kg	10 ug/kg J	4.6 x SQL
	Tetrachloroethene	230 ug/kg	1 ug/kg J	230 x REF
	Aldrin	9.4 ug/kg J	1.8 ug/kg	5.2 x SQL
	Deldrin	6.0 ug/kg J	3.4 ug/kg J	1.8 x SQL
	4,4'-DDE	64 ug/kg J	3.4 ug/kg	18.8 x SQL
	Endosulfan II	7.4 ug/kg J	3.4 ug/kg	2.2 x SQL
	4,4'-DDT	250 ug/kg J*	3.4 ug/kg J	73.5 x SQL
	Methoxychlor	19 ug/kg J	18 ug/kg	1.1 x SQL
	Beryllium	0.31 mg/kg	0.08 mg/kg	3.9 x SDL
	Cobalt	6.1 mg/kg	2.6 mg/kg	2.3 x SDL
	Copper	58.9 mg/kg	18.7 mg/kg	3.1 x REF
	Lead	90.3 mg/kg J	8.2 mg/kg J	11 x REF
	Mercury	0.08 mg/kg	0.05 mg/kg	1.6 x SDL
	Nickel	14.8 mg/kg	4.2 mg/kg	3.5 x REF
	Zinc	98.2 mg/kg J	19.4 mg/kg J	5.1 x REF
SS-02 ADD42 MAAZ61	Methylene Chloride	32 ug/kg J	15 ug/kg	2.1 x SQL
	Trichloroethene	41 ug/kg	10 ug/kg	4.1 x SQL
	Tetrachloroethene	270 ug/kg J*	1 ug/kg J	270 x REF
	4,4'-DDE	21 ug/kg J	3.4 ug/kg	6.2 x SQL
	4,4'-DDT	87 ug/kg J*	3.4 ug/kg	25.6 x SQL
	Beryllium	1.2 mg/kg	0.08 mg/kg J	15 x SDL
	Cobalt	6.7 mg/kg	2.6 mg/kg	2.6 x SDL
	Copper	67.1 mg/kg	18.7 mg/kg	3.6 x REF
	Lead	177 mg/kg J	8.2 mg/kg J	21.6 x REF
	Mercury	0.08 mg/kg	0.05 mg/kg	1.6 x SDL
	Nickel	18.8 mg/kg	4.2 mg/kg	4.5 x REF
	Zinc	121 mg/kg J	19.4 mg/kg J	6.2 x REF

Table 5

**Summary of Analytical Results:
Source Sample Analysis for Hubbard Hall Chemical
(Continued)**

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SS-03 ADD43 MAAZ62	Acetone	3,300 ug/kg **	10 ug/kg	330 x SQL
	Tetrachloroethene	7,200 ug/kg **	1 ug/kg J	7,200 x REF
	4,4'-DDT	29 ug/kg J	3.4 ug/kg	8.5 x SQL
	Arsenic	6.7 mg/kg J	2.1 mg/kg J	3.2 x REF
	Beryllium	0.13 mg/kg	0.08 mg/kg	1.6 x SDL
	Cobalt	5.3 mg/kg	2.6 mg/kg	2 x SDL
	Copper	70.3 mg/kg	18.7 mg/kg	3.8 x SDL
	Lead	185 mg/kg J	8.2 mg/kg J	22.6 x REF
	Manganese	235 mg/kg J	69.9 mg/kg J	3.4 x REF
	Mercury	0.09 mg/kg	0.05 mg/kg	1.8 x SDL
	Zinc	118 mg/kg J	19.4 mg/kg J	6.1 x REF
SD-10 ADD50 MAAZ69	Acetone	2,100 ug/kg J	10 ug/kg	210 x SQL
	1,1-Dichloroethane	16 ug/kg J	10 ug/kg	1.6 x SQL
	2-Butanone	71 ug/kg	10 ug/kg	7.1 x SQL
	Trichloroethene	27 ug/kg	10 ug/kg	2.7 x SQL
	Tetrachloroethene	29 ug/kg J	1 ug/kg J	29 x REF
	Phenanthrene	500 ug/kg J	340 ug/kg	1.5 x SQL
	Fluoranthene	910 ug/kg J	340 ug/kg	2.7 x SQL
	Pyrene	1,300 ug/kg J	340 ug/kg	3.8 x SQL
	Benzo(a)anthracene	490 ug/kg J	340 ug/kg	1.4 x SQL
	Chrysene	720 ug/kg J	340 ug/kg	2.1 x SQL
	Bis(2-ethylhexyl)phthalate	3,700 ug/kg J	340 ug/kg	10.9 x SQL
	Di-n-octylphthalate	520 ug/kg J	340 ug/kg	1.5 x SQL
	Benzo(b)fluoranthene	1,400 ug/kg J	340 ug/kg	4.1 x SQL
	Benzo(a)pyrene	480 ug/kg J	340 ug/kg	1.4 x SQL
	Indeno(1,2,3-cd)pyrene	410 ug/kg J	340 ug/kg	1.2 x SQL
	Benzo(g,h,i)perylene	690 ug/kg J	340 ug/kg	2.0 x SQL
	Dieldrin	35 ug/kg J	3.4 ug/kg	10.3 x SQL

Table 5

**Summary of Analytical Results:
Source Sample Analysis for Hubbard Hall Chemical Inc.
(Concluded)**

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SD-10 ADD50 MAAZ69 (cont'd)	4,4'-DDE	1,100 ug/kg J*	3.4 ug/kg	323.5 x SQL
	4,4'-DDD	2,100 ug/kg J*	3.4 ug/kg	617.6 x SQL
	4,4'-DDT	1,100 ug/kg J*	3.4 ug/kg	323.5 x SQL
	alpha-Chlordane	35 ug/kg J	1.8 ug/kg	19.4 x SQL
	gamma-Chlordane	40 ug/kg J	1.8 ug/kg	22.2 x SQL
	Aluminum	26,600 mg/kg J	3,440 mg/kg J	7.7 x REF
	Arsenic	8.3 mg/kg J	2.1 mg/kg J	4.0 x REF
	Barium	173 mg/kg	21.8 mg/kg	7.9 x REF
	Beryllium	1.7 mg/kg	0.08 mg/kg	21.3 x SDL
	Calcium	14,000 mg/kg	356 mg/kg	39.3 x REF
	Chromium	76.5 mg/kg	5.0 mg/kg J	15.3 x REF
	Cobalt	30.3 mg/kg	2.6 mg/kg	11.7 x SDL
	Copper	422 mg/kg	18.7 mg/kg	22.6 x REF
	Iron	48,900 mg/kg	7,790 mg/kg	6.3 x REF
	Lead	396 mg/kg J	8.2 mg/kg J	48.3 x REF
	Magnesium	10,600 mg/kg	1,200 mg/kg	8.8 x REF
	Manganese	819 mg/kg J	69.9 mg/kg J	11.7 x REF
	Mercury	0.52 mg/kg	0.05mg/kg	10.4 x SDL
	Nickel	69.0 mg/kg	4.2 mg/kg	16.4 x REF
	Potassium	3,670 mg/kg	757 mg/kg	4.8 x REF
	Silver	7.3 mg/kg	0.49 mg/kg	14.9 x SDL
	Sodium	1,340 mg/kg	73.8 mg/kg	18.2 x SDL
	Vanadium	116 mg/kg	10.3 mg/kg	11.3 x REF
	Zinc	642 mg/kg J	19.4 mg/kg J	33.1 x REF

* = Result reported from diluted analysis.

** = Result reported from Medium Level analysis.

J = Quantitation is approximate due to limitations identified during the quality control review.

ug/kg = Micrograms per Kilogram

mg/kg = Milligrams per Kilogram

REF = Reference Concentration

SQL = Sample Quantitation Limit

SDL = Sample Detection Limit

Six volatile organic compounds (VOCs) were detected in these samples. They are acetone, methylene chloride, 1,1-dichloroethene, 2-butanone, tetrachloroethene and trichloroethene. The VOC detected at the highest concentration was tetrachloroethene (7,200 ug/kg) at sample location SS-03 located at the former transfer pumping station. Tetrachloroethene was also detected in the other three soil/sediment samples and may be the result of historical spillage.

Eleven semi-volatile organic compounds (SVOCs) were detected in these samples. The SVOC detected at the highest concentration was Bis(2-ethylhexyl)phthalate (3,700 ug/kg) at sample location SD-10 located inside the concrete holding tank at the railroad drainage ditch 600-feet north of South Leonard Street. The presence of bis(2-ethylhexyl)phthalate, a liquid used in vacuum pumps, may result from operating a vacuum pump in the holding tank. However, use of a vacuum pump could not be determined during the background investigation.

Nine pesticides were detected in these samples. The pesticide detected at the highest concentration was 4,4'-DDD (2,100 ug/kg) at sample location SD-10 also in concrete holding tank at the railroad drainage ditch. The presence of pesticides on the Hubbard Hall property could not be attributed to known site operations. No polychlorinated biphenyls (PCBs) were found in the source samples collected.

Metals exceeding natural ranges observed in the soil in the United States include beryllium, cobalt, copper, iron, lead, magnesium, nickel, vanadium and zinc (no range was provided for chromium). Metals detected above the reference concentration include aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, vanadium and zinc. Lead levels ranged from 11.0 times the reference concentration in SS-01 (90.3 mg/kg) to 48.3 times the reference concentration in SD-109 (396 mg/kg). Chromium was detected at 15.3 times the reference concentration in SD-10 (76.5 mg/kg). Nickel levels ranged from 3.5 times the reference concentration in SS-01 (14.8 mg/kg) to 16.4 times the reference concentration in SD-10 (69.0 mg/kg). According to shipping manifests, it is likely the metals detected in the soil and sediment samples are products of Hubbard Hall manufacturing processes [32,33,34,35].

GROUNDWATER PATHWAY

Bedrock in the property area is mapped as Waterbury Gneiss. This is a Cambrian aged unit consisting of fine-to-medium grained schist and gneiss [36,37]. Depth to bedrock is approximately 50-feet below grade [38]. Based on the United States Geological Survey (USGS) topographic map of Waterbury, depth to groundwater is estimated to be between 20 and 50 feet below grade, and flowing east toward the Naugatuck River [39].

Subsurface materials overlying bedrock at the subject property are described as stratified drift with a saturated thickness ranging from 40 to 80 feet. Stratified drift is a predominantly sorted sediment laid down by glacial meltwater. This includes stratified sand and gravel and minor amounts of silt and clay exhibiting a variable degree of sorting [19]. Most of the property is covered with compacted dirt and gravel with some asphalt, in fair condition, located on the south side of the office building [4]. Stormwater infiltration is likely to occur throughout the property [4]. Net annual precipitation is estimated to be twenty inches per year, including the effects of

lake evaporation [40].

Groundwater quality immediately beneath the Hubbard Hall site has been classified as GB by the CT DEP [41]. Groundwater with this classification is currently not suitable for direct human consumption due to waste discharges, spills or leaks of chemical or land use impacts. Groundwater surrounding the Hubbard Hall property is also classified as GB [41].

The closest public supply well is 2.2 miles southeast of the Hubbard Hall property. The nearest private drinking water well is within 2 miles of the Hubbard Hall property; its exact location is unknown and could not be located during the background investigation [8]. There are no known wellhead protection areas or blended water systems within four miles of Hubbard Hall [42].

An estimated 16,135 people are served water by public and private water supply wells within four miles of the site [43]. The properties immediately surrounding Hubbard Hall are served by the Waterbury Water Department which obtains water from reservoirs located in Waterbury, Watertown and Thomaston, Connecticut. Table 6 summarizes public water supply sources within four miles of Hubbard Hall [43]. Table 7 summarizes the estimated population served by all groundwater sources within four miles of Hubbard Hall [43].

Table 6
Public Groundwater Supply Sources Within Four Miles
of Hubbard Hall Chemical Inc.

Distance/Direction from Site	Source Name	Location of Source	Estimated Population Served [38]	Source Type
2.2 to 2.7 miles SE	Highland Heights Water Co.	Prospect	NA	Abandoned
3.2 miles W	Middlebury Commons	Middlebury	76	Bedrock
2.5 to 2.9 miles SE	Indian Field Co.	Prospect	140	Bedrock
2.5 to 2.9 miles SE	Indian Hill Water Co.	Naugatuck	2,460	Bedrock
3.3 miles SW	Idleview Mobile Home Park	Naugatuck	138	Bedrock
3.7 to 3.9 miles SE	Country Manor Health Care Center.	Prospect.	150	Bedrock
TOTAL			2,964	

NA = Not applicable
[8,38,42]

Table 7

**Estimated Drinking Water Populations
Served by Groundwater Sources Within Four Miles of
Hubbard Hall Chemical Inc.**

Radial Distance From Hubbard Hall (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Populations Served by Groundwater Sources Within the Ring
0.00 < 0.25	0	0	0
0.25 < 0.50	0	0	0
0.50 < 1.00	0	0	0
1.00 < 2.00	1,320	0	1,320
2.00 < 3.00	3,798	242	4,040
3.00 < 4.00	5,331	2,722	10,775
TOTAL	10,449	2,964	16,135

[43,58,59,60,61,62,63,64,65]

Groundwater use was determined by totalling the number of groundwater users in each of the Census Block Groups in each of the distance rings. Census Block Group data were also used to determine the number of people using private wells within each distance ring. Populations using public well water within each ring were based on totals from the "Atlas of Public Water Supply Sources and Drainage Basins in Connecticut" compiled by the CT DEP and CT DOHS municipal water user data [43,44].

No known groundwater sampling has been conducted on the property to date and no groundwater violations are on file in the CT DEP or EPA files [8].

SURFACE WATER PATHWAY

The Hubbard Hall property is located approximately 500 feet west of the Naugatuck River. According to the Flood Insurance Rate Maps (FIRM) published by the Federal Emergency Management Agency (FEMA), the property is located in a Zone C, or an area of minimal flooding outside of the 500 year floodplain [8].

The overland flow route likely begins on the subject property's upper elevation as sheet flow from west to east [4]. Storm water then flows over the embankment or into catch basins which discharge onto the embankment. Storm water then flows into storm water sewers located on South Leonard Street before discharging into Naugatuck River approximately 400 feet east of the site [4].

The most upstream Probable Point of Entry (PPE) is along the west bank of the Naugatuck River near South Leonard Street [44]. The surface water migration pathway begins at the Naugatuck River and follows the Naugatuck River for fifteen miles [39]. The end of the 15 mile surface water migration pathway is in the Naugatuck River adjacent to the Hull-Die Corporation in Ansonia, Connecticut [39,45,46].

The Naugatuck River is classified as a Class C/B by the CT DEP, indicating water which is suitable for certain fish and wildlife habitats, agricultural and industrial supply [41]. Classification C/B may preclude swimming and indicates that one or more quality criteria is impaired [41]. The CT DEP goal is to upgrade these waters to Class B [41]. Table 8 presents water bodies within the surface water pathway of Hubbard Hall.

Table 8

**Water Bodies Within the Surface Water Segment of
Hubbard Hall Chemical Inc.**

Surface Water Body	Description ^a	Length of Reach	Flow Characteristics (cfs) ^b	Length of Wetlands
Naugatuck River	Moderate to Large Stream	15 miles	501	Not Applicable

^aMinimal stream. Small to moderate stream. Moderate to large stream. Large stream to river. Very large river. Coastal tidal waters. Shallow ocean zone or Great Lake. Deep ocean zone or Great Lake. Three-mile mixing zone in quiet river.

^bCubic feet per second.

[39,47]

The average flow of the Naugatuck River at the Beacon Falls, Connecticut gaging station is approximately 501 cubic feet per second (ft³/sec), defining the Naugatuck River as a moderate to large stream [47]. The Beacon Falls gaging station is approximately 6.5 miles south of Hubbard Hall Chemical Inc. in the Naugatuck River [39]. There are no surface water intakes in the Naugatuck River along the 15 mile surface water migration pathway [44]. The CT DEP surface water classification of C/B precludes the use of the Naugatuck River as a drinking water supply source [48]. Although there are no known fisheries, the Naugatuck River is suitable as a recreational fishery [44].

No wetlands are known to exist along the 15 mile surface water pathway of Hubbard Hall. The Naugatuck State Forest, however, is located on both sides of the Naugatuck River with an estimated total frontage of four miles [45]. There are no CT DEP Natural Diversity Database Points (NDDB) within one mile of the property [49]. An NDDB point represents State or Federally listed endangered, threatened or special concern species or habitat [49]. Natural Diversity Database information for the 15 mile downstream pathway was unavailable [49].

On October 6, 1992, WESTON/ARCS collected two surface sediment samples from areas identified during the September 24, 1992 OSR. One of the two sediment samples is identified as a source area (SD-10) and discussed in that section. The second sediment sample (SD-11)

was submitted for full organic, total metals, and cyanide analyses through the EPA Contract Laboratory Program (CLP). A sample summary is provided in Table 9.

Table 10 is a summary of compounds and elements detected through CLP analyses of WESTON/ARCS soil and sediment samples. For each sample location, a compound or element is listed if it is detected at three times or greater than the reference sample concentration (SS-04). Compounds or elements which occur at a concentration three times or greater than the reference concentration are designated by their approximate relative concentration above the reference sample concentration. However, if the element or compound is not detected in the reference sample, the reference sample's SQL (for organic analyses) or SDL (for inorganic analyses) is used as the reference value. Accordingly, these compounds or elements are listed by their approximate relative concentration only if they occur at a value equal to or greater than the reference sample's SQL or SDL.

The complete analytical results of the WESTON/ARCS sampling activities, including quantitation and detection limits, are presented in Attachment C. Sample results qualified with a "J" on the analytical tables are considered approximate because of limitations identified during the CLP data validation. In addition, organic sample results reported at concentrations below quantitation limits and confirmed by mass spectrometry are also qualified by a "J" and considered approximate.

Table 9

**Sample Summary: Hubbard Hall Chemical Inc.
Surface Sediment Samples Collected by WESTON/ARCS on October 6, 1992**

Sample Location No.	Traffic Report No.	Time	Remarks	Sample Source	Sample Description
MATRIX: SEDIMENT					
SS-04	ADD44 MAAZ63	0910	Grab for VOCs. All others were Composite, depth = 18 inches	QA/QC reference sample collected in vacant lot 64 feet north side of maintenance garage. Soil comprised of dry brown silt with some coarse sand.	Soil comprised of damp brown silt with some coarse sand.
SD-11	ADD51 MAAZ70	1106	Grab, depth = 3 inches	Collected from discharge of catch basin located 106 ft east-northeast of main warehouse and office building. Soil comprised of dry dark brown silt with fine sand.	Soil comprised of wet black silt with very fine sand.

[4]

Table 10

**Summary of Analytical Results:
Surface Sediment Sampling Analysis for Hubbard Hall Chemical Inc.**

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SD-11 ADD51 MAAZ70	Tetrachloroethene	27 ug/kg J	1 ug/kg J	27 x REF
	4,4'-DDE	5.8 ug/kg J	3.4 ug/kg	1.7 x SQL
	Endosulfan II	4.4 ug/kg J	3.4 ug/kg	1.3 x SQL
	4,4'-DDT	23 ug/kg J	3.4 ug/kg	6.8 x SQL
	Aluminum	11,200 mg/kg J	3,440 mg/kg J	3.3 x REF
	Beryllium	0.37 mg/kg	0.08 mg/kg	4.6 x SDL
	Chromium	63.0 mg/kg	5.0 mg/kg J	12.6 x REF
	Copper	117 mg/kg	18.7 mg/kg	6.3 x REF
	Nickel	14.0 mg/kg	4.2 mg/kg	3.3 x REF

J = Quantitation is approximate due to limitations identified during the quality control review.

ug/kg = Micrograms per Kilogram

mg/kg = Milligrams per Kilogram

REF = Reference Concentration

SQL = Sample Quantitation Limit

SDL = Sample Detection Limit

No SVOCs or PCBs were found in the sample collected. However one VOC, three pesticides and five metals were detected. The VOC, tetrachloroethene was detected at 27 ug/kg and may be the result of on-site storage of chlorinated solvents. The pesticide detected at the highest concentration was 4,4'-DDT (23 ug/kg). The presence of DDT could not be attributed to known site operations.

Of the metals analyzed for, only copper exceeded the natural range observed in soil in the United States. Copper was detected at 6.3 times the reference concentration (117 mg/kg). Chromium was the highest concentration metal at 12.6 times the reference concentration (63 mg/kg). According to shipping manifests, it is likely the metals detected are products of Hubbard Hall manufacturing processes [32,33,34,35].

SOIL EXPOSURE PATHWAY

The Hubbard Hall facility currently employs approximately 87 people on one shift [1]. There are no known residents within 200 feet of the property. The nearest residences are located approximately 1,000 feet to the west of the site. An estimated 11,926 people live within one mile of the Hubbard Hall property [43]. There are no known schools or day-care facilities

located within 200 feet of areas of observed contamination [1,39]. The closest school is located approximately one-half mile to the southeast of the property [39]. There are seven additional schools located within one mile of the Hubbard Hall facility [39]. There is no evidence of terrestrial sensitive environments on or near areas of observed contamination [1,39]. According to the CT DEP Natural Diversity Database, there are no Federal or State endangered, threatened or special concern species within one mile of Hubbard Hall [49].

Soil sampling activities at the Hubbard Hall date back to 1982. In September 1982 an anonymous complaint cited Hubbard Hall for allegedly discharging 8,000 gallons of chlorinated and non-chlorinated solvents to the ground. The CT DEP investigated the complaint and collected two soil samples from a depression located near the equipment staging area. The laboratory data could not be located during the State and Local file search. A CT DEP interdepartmental memorandum indicated the laboratory found trace amounts of chlorinated solvents in the samples [13,14]. Analytical results could not be located during the background investigation [8].

On October 15, 1984, an Emergency Incident Report was filed with the CT DEP concerning a 2,800 gallon methylene chloride spill to the ground, near the transfer pumping station, during a transfer operation [18]. HRP performed an emergency investigation of the spill on the same day. HRP excavated approximately 204 cubic yards of soil over a five day period. Post-excavation soil samples were collected to confirm that all contaminated soils had been removed prior to backfilling with clean material [19]. All excavated soils were disposed at a landfill approved by the CT DEP [19].

On October 18, 1984, a second Emergency Incident Report was filed with the CT DEP concerning a 25 to 30 gallon spill of 1,1,1-trichloroethane released to the ground near the former transfer pumping station [20]. HRP performed an emergency investigation of the spill on the same day. HRP removed approximately seven cubic yards of contaminated soil over a five day period. Post-excavation soils were collected to confirm the absence of residual contamination prior to backfilling with clean material [19]. Analytical results of soil samples collected from the walls and floor of excavated pits indicated methylene chloride concentrations between 3.0 and 1,304.6 mg/L. Further excavation reduced these concentrations to levels of non-detect to 1.55 mg/L. Analytical results from soil samples collected at the base and wall of excavated pits indicated concentrations of 1,1,1-trichloroethane ranging between non-detect and 0.11 mg/L. All excavated soils were disposed at a landfill approved by the CT DEP [18,19,20].

On October 6, 1992 WESTON/ARCS collected six soil samples from areas identified during the WESTON/ARCS September 24, 1992 on-site reconnaissance. Soil samples were submitted for full organic, total metals, and cyanide analyses through the EPA/Contract Laboratory Program (CLP). A sample summary is provided in Table 11.

Table 12 is a summary of compounds and elements detected through CLP analyses of WESTON/ARCS soil samples. For each sample location, a compound or element is listed if it is detected at three times or greater than the reference sample concentration (SS-04). Compounds or elements which occur at a concentration three times or greater than the reference concentration are designated by their approximate relative concentration above the reference sample concentration. However, if the element or compound is not detected in the reference

sample, the reference sample's SQL (for organic analyses) or SDL (for inorganic analyses) is used as the reference value. Accordingly, these compounds or elements are listed by their approximate relative concentration only if they occur at a value equal to or greater than the reference sample's SQL or SDL.

The complete analytical results of the WESTON/ARCS sampling activities, including quantitation and detection limits, are presented in Attachment C. Sample results qualified with a "J" on the analytical tables are considered approximate because of limitations identified during the CLP data validation. In addition, organic sample results reported at concentrations below quantitation limits and confirmed by mass spectrometry are also qualified by a "J" and considered approximate.

Table 11

**Sample Summary: Hubbard Hall Chemical Inc.
Soil Samples Collected by WESTON/ARCS on October 6, 1992**

Sample Location No.	Traffic Report No.	Time	Remarks	Sample Source	Sample Description
MATRIX: SOIL					
SS-04	ADD44 MAAZ63	0910	Grab for VOCs. All others were Composite, depth = 18 inches	QA/QC reference sample collected in vacant lot 64 feet north of maintenance garage.	Soil comprised of damp brown silt with some coarse sand.
SS-05	ADD45 MAAZ64	1030	Grab for VOCs. All others were Composite, depth = 18 inches	Collected 72 feet northeast of main building's northeast corner, near a catch basin.	Soil comprised of damp brown silt with some coarse sand.
SS-06	ADD46 MAAZ65	1012	Grab for VOCs. All others were Composite, depth = 30 inches	Collected along west perimeter fence midway (147 ft) between maintenance garage and railroad track gate.	Soil comprised of damp brown silt with some coarse sand.
SS-07	ADD47 MAAZ66	1255	Grab for VOCs. All others were Composite, depth = 8 inches	Collected west of aboveground tank farm.	Soil comprised of dry brown silt with some fine sand.
SS-08	ADD48 MAAZ67	1148	Grab for VOCs. All others were Composite, depth = 8 inches	Collected at the west side of equipment staging area.	Soil comprised of damp brown silt with some fine sand.
SS-09	ADD49 MAAZ68	1150	Grab for VOCs. All others were Composite, depth = 12 inches	Collected east of equipment staging area.	Soil comprised of wet brown silt with some coarse sand.

[4]

Table 12

**Summary of Analytical Results:
Soil Sampling Analysis for Hubbard Hall Chemical Inc.
(Continued)**

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SS-06 ADD46 MAAZ65	Tetrachloroethene	8 ug/kg J	1 ug/kg J	8 x REF
	Aluminum	11,800 mg/kg J	3,440 mg/kg J	3.4 x REF
	Beryllium	0.37 mg/kg	0.08 mg/kg	4.6 x SDL
	Cobalt	7.9 mg/kg	2.6 mg/kg	3 x SDL
	Manganese	258 mg/kg J	69.9 mg/kg J	3.7 x REF
SS-07 ADD47 MAAZ66	Trichloroethene	55 ug/kg	10 ug/kg	5.5 x SQL
	Tetrachloroethene	220 ug/kg J	1 ug/kg J	220 x REF
	Phenanthrene	600 ug/kg J	340 ug/kg	1.8 x SQL
	Fluoranthene	600 ug/kg J	340 ug/kg	1.8 x SQL
	Pyrene	480 ug/kg J	340 ug/kg	1.4 x SQL
	4,4'-DDE	16 ug/kg J	3.4 ug/kg	4.7 x SQL
	4,4'-DDT	56 ug/kg J	3.4 ug/kg	16.5 x SQL
	Aroclor 1254	1,200 ug/kg J*	34 ug/kg	35.3 x SQL
	Calcium	2,250 mg/kg	356 mg/kg	6.3 x REF
	Cobalt	6.1 mg/kg	2.6 mg/kg	2.3 x SDL
	Lead	120 mg/kg J	8.2 mg/kg J	14.6 x REF
	Sodium	206 mg/kg	73.8 mg/kg	2.8 x SDL
	Zinc	152 mg/kg J	19.4 mg/kg J	7.8 x REF
SS-08 ADD48 MAAZ67	Trichloroethene	160 ug/kg J	10 ug/kg	16 x SQL
	Tetrachloroethene	160 ug/kg	1 ug/kg J	160 x REF
	Dimethylphthalate	570 ug/kg J	340 ug/kg	1.7 x SQL
	Hexachlorobenzene	360 ug/kg J	340 ug/kg	1.1 x SQL
	4,4'-DDE	3,500 ug/kg J*	3.4 ug/kg	1,029.4 x SQL
	4,4'-DDT	3,200 ug/kg J*	3.4 ug/kg	941.2 x SQL
	Aroclor 1254	6,400 ug/kg J*	34 ug/kg	188.2 x SQL
	Aluminum	11,200 mg/kg J	3,440 mg/kg J	3.3 x REF
	Beryllium	0.42 mg/kg	0.08 mg/kg	5.3 x SDL

Table 12

**Summary of Analytical Results:
Soil Sampling Analysis for Hubbard Hall Chemical Inc.
(Concluded)**

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SS-08 ADD48 MAAZ67 (cont'd)	Cobalt	5.7 mg/kg	2.6 mg/kg	2.2 x SDL
	Lead	75.0 mg/kg J	8.2 mg/kg J	9.1 x REF
	Mercury	0.17 mg/kg	0.05 mg/kg	3.4 x SDL
	Sodium	1,940 mg/kg	73.8 mg/kg	26.3 x SDL
	Zinc	79.8 mg/kg J	19.4 mg/kg J	4.1 x REF
SS-09 ADD49 MAAZ68	Methylene Chloride	37 ug/kg J	10 ug/kg	3.7 x SQL
	1,1,1-Trichloroethane	14 ug/kg	14 ug/kg	1.4 x SQL
	Trichloroethene	31 ug/kg	10 ug/kg	3.1 x SQL
	Tetrachloroethene	77 ug/kg J	1 ug/kg J	77 x REF
	Fluoranthene	360 ug/kg J	340 ug/kg	1.1 x SQL
	Pyrene	400 ug/kg J	340 ug/kg	1.2 x SQL
	Benzo(b)fluoranthene	570 ug/kg J	340 ug/kg	1.7 x SQL
	Aldrin	7.9 ug/kg J	1.8 ug/kg	4.4 x SQL
	4,4'-DDE	86 ug/kg J	3.4 ug/kg	25.3 x SQL
	4,4'-DDT	990 ug/kg J*	3.4 ug/kg	291.2 x SQL
	Lead	355 mg/kg J	8.2 mg/kg J	43.3 x REF
	Mercury	0.34 mg/kg	0.05 mg/kg	6.8 x SDL
	Selenium	0.88 mg/kg	0.68 mg/kg	1.3 x SDL

* = Result reported from diluted analysis.

** = Result reported from Medium Level analysis.

J = Quantitation is approximate due to limitations identified during the quality control review.

ug/kg = Micrograms per Kilogram

mg/kg = Milligrams per Kilogram

REF = Reference Concentration

SQL = Sample Quantitation Limit

SDL = Sample Detection Limit

Five VOCs were detected in these samples. They include acetone, trichloroethene, tetrachloroethene, methylene chloride and 1,1,1-trichloroethane. The VOC detected at greatest concentration was tetrachloroethene (3,600 ug/kg) at sample location SS-05 located near a catch basin northeast of the warehouse. This may be related to historical chlorinated solvent storage

on the property.

Six SVOCs were detected in these samples. They include phenanthrene, fluoranthene, pyrene, dimethylphthalate, hexachlorobenzene and benzo(b)fluoranthene. The SVOCs detected at the greatest concentrations were phenanthrene and fluoranthene (both at 600 ug/kg) at sample location SS-07 located at the west side of the tank farm.

Fourteen pesticides were detected in these samples. The pesticide 4,4'-DDT was detected at 6,176 times the SQL in SS-05 (21,000 ug/kg), 941 times the SQL in SS-08 (3,200 ug/kg) and 291 times the SQL in SS-09 (990 ug/kg). The pesticide 4,4'-DDE was detected at 1,029 times the SQL in SS-08 (3,500 ug/kg) and 529 times the SQL in SS-05 (1,800 ug/kg). Sample location SS-05 also detected dieldrin, alpha-Chloridane and gamma-Chlordane at high concentrations; dieldrin was detected at 205.9 times the SQL (700 ug/kg), alpha-chlordane was detected at 505.6 times the SQL (910 ug/kg), and gamma-chloridane was detected at 555.6 times the SQL (1,000 ug/kg).

One PCB was detected. Aroclor 1254 was detected at 188 times the SQL (6,400 ug/kg) at sample location SS-08.

Fifteen metals were detected in these samples. Metals including copper, lead, nickel and zinc exceeded the natural range in soil in the United States. Chromium was detected at 20.4 times the reference concentration in SS-05 (102 mg/kg). Copper was detected at 39.5 times the reference concentration in SS-05 (739 mg/kg). Lead levels ranged from 9.1 times the reference concentration in SS-08 (75.0 mg/kg) to 43.3 times the reference concentration in SS-09 (355 mg/kg). Nickel was detected in SS-05 at 32.9 times the reference concentration (138 mg/kg). According to shipping manifests, it is likely the metals detected are products of Hubbard Hall manufacturing processes [32,33,34,35].

AIR PATHWAY

The nearest individuals to the Hubbard Hall property are the 87 full-time on-site workers. No one resides within 1000 feet of the property [1]. An estimated 133,034 individuals reside within four miles of Hubbard Hall [43]. There are an estimated 2,185 students within one mile of Hubbard Hall [50,51,52,53,54,55,56,57]. There are an estimated 100 persons who work for commercial/industrial businesses located 500-feet from the Hubbard Hall property [1]. Other worker population information within four miles of Hubbard Hall was not available. Table 13 shows estimated populations within four miles of Hubbard Hall.